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Abstract
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Crops of ancient Iowa: Native plant use and farming systems

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$11,695 for one year

Background and goals

Maize and common beans were introduced as crops some 1,000 years ago to the land we now call Iowa. They marked the beginning of intensive agriculture in this area. But humans had begun evolving from hunter-gatherers to farmers several thousands of years earlier. This ancient agriculture in Iowa was characterized by changing patterns in the use of both native and introduced crops.

Knowing just how ancient, native plants were used is critical to understanding how plants, the land, and humans interacted over many thousands of years. The study described here was the first in the Midwest to systematically evaluate data about ancient plants and their use in the context of sustainable agriculture. Although the crop management methods of 2,000 years ago do not figure directly in today's complex agricultural system, greater awareness of past farming systems can be instructive in answering questions such as how the climatic change many claim is already under way will affect agriculture.

The primary goal of this work, known as the Iowa Statewide Archeobotanical Survey, was to identify and outline the prehistory and geography of native cultivars (cultivated plant variants) in Iowa. Native plants are a critical component of sustainable agricultural systems. Thus, an understanding of past agricultural practices will broaden the range of ideas we can consider as we search for alternative, more sustainable, modern agricultural systems.

These investigators set out specifically to identify

- the *types* of plants used in ancient Iowa,
- their *distribution* in space and through time,
- the *nature* of the evidence for their use,
- interpretations of *farming methods* and *cultural-ecological implications,* and
- suggested *future research.*

Archaeological data on ancient Iowa crops have been scattered through many technical and unpublished reports. This means that farmers and agronomists have not had ready access to the enormous amount of information already compiled. Consequently, agronomic researchers have not benefited from an awareness of how Iowa's prehistoric farmers cultivated various crop plants and how historical use patterns can inform changes in today's agriculture.

The eastern and midwestern United States constitute one of only six primary centers of prehistoric plant domestication worldwide. Several of the native species commonly found in archaeobotanical samples exhibit physical changes that indicate purposeful selection and domestication. Although humans extended the geographic ranges of certain species during prehistory, these plants have since retracted to their natural range. Masses of literally millions of seeds from native cultigens (horticultural varieties not known to exist in a wild state) have been found in storage facilities and refuse deposits at several midwestern

sites. Such stores clearly indicate that humans collected them and probably relied on them as a food/fiber source to varying degrees. These native cultigens were excellent sources of important nutrients, and they could have been grown with minimal tending in diversified gardens and fields.

Prior to the 1960s, archaeological plant remains in Iowa had not been studied except for large specimens such as corn cobs and kernels. Even those few reports were not published. Moreover, the proportionately great increase in such research activity over the past 30 years has also suffered from a lack of methodical documentation. *This project represents a comprehensive, unprecedented effort to illuminate the role native plants played in agriculture for more than 2,000 years in Iowa.*

Approach and methods

This study sought information on

- where archaeobotanical studies have and have not been conducted;
- which time periods are well represented and which need further study;
- the temporal and geographic distribution of each significant cultigen and other archaeologically recovered plant remains;
- the locations at which significant Iowa archaeobotanical collections are housed;
- inferred prehistoric and early historic crop management systems, their changes through time, and their ecological effects; and
- the most promising areas for further study, experimentation, and application of data on ancient farming.

Investigators began the Iowa Statewide Archaeobotanical Survey by compiling all available information on Iowa archaeological plant remains. They searched all relevant archaeological literature, archives, and other sources. Then they tabulated and summarized data on every identified plant, both native and introduced, using an expandable, relational database system. They also drafted distribution maps showing where various cultigens were used in space and over time.

In compiling their information, these investigators defined *cultivation* as the deliberate human encouragement of the reproduction of a plant species. Their criteria, or evidence, included

- recognition of morphological changes in the prehistoric material that are a consequence of domestication (they also established their working definition of *domestication* as genetic changes that occur in plants under cultivation, either through deliberate human selection or through unintended adaptations of the plant to the human-rnanipulated environment);
- recognition of a change in the plant's geographic range as a consequence of its introduction beyond the region where it occurs naturally; and
- recognition of a level of use that could not have been sustained by gathering from wild stands alone.

The investigators compiled archaeobotanical records for all major taxa (classifications) of crop plants, reviewing the cultivation evidence and placing each one in a spatial and chronological framework. The taxa included were squash and yellow-flowered gourd, bottle gourd, sumpweed, common sunflower, goosefoot, knotweed, little barley (see Fig. 1), maygrass and reed canarygrass, tobacco, maize, the common bean, and watermelon.

Findings

This project assembled a bibliography of Iowa archaeobotanical literature and critically reviewed evidence for prehistoric agriculture in the state. The information emerging from this study, based on a large number of other studies and bibliographic sources, constitutes a huge new store of critically reviewed and logically organized data about how certain native, prehistorically important Iowa crop plants were cultivated and used.

In the process, these investigators discovered that the number of existing archeobotanical studies is surprisingly large. Although coverage is spotty, enough has been learned to make an initial outline of prehistoric plant use and to

indicate directions for future research. They also discovered that a flotation technique used in excavations proved to be the most helpful means in separating small-scale plant remains from surrounding material.

Only in the last decade have archeologists widely agreed that pre-maize agriculture made an important contribution to the food supply. Now they also know that intensive agriculture was already under way in some parts of eastern North America as long as 3,000 to 4,000 years ago. The very roots of this agriculture appear to go back even thousands of years earlier.

This study provides striking evidence that the full variety of eastern North American crop plants present 1,000 years ago had become adapted in cultivation to a wide range of environments—from the prairies of northwest Iowa to the humid woodlands of the Southeast. These investigators also learned that Native Americans who normally lived in small, highly mobile, strongly hunting-oriented bands scheduled cultivation into their annual activities.

Implications

In this study, investigators reviewed all available Iowa archaeological patterns of prehistoric plant cultivation and compared them to records for neighboring parts of the Midwest. These investigators believe that ancient plant cultivation in Iowa can illuminate patterns in long-term agroecological relationships. They also believe that ancient Iowans participated fully in native crop domestication and use long before corn and beans were introduced into the region. Knowledge of such relationships and practices may prove useful to modern sustainable agriculture efforts.

This study was the first in the Midwest to systematically evaluate data about ancient plants and their use in the context of sustainable agriculture. Although crop management methods useful 2,000 years ago can hardly be directly applied to today's complex agricultural system, greater awareness of past farming systems can be useful in various ways.

For example, as a result of this research, today's researchers can consider more knowledgeably how ancient, native plants might be adaptable to regions outside their natural distribution areas. Such considerations can provide the basis for greater crop diversification. Ultimately, knowledge of ancient practices and systems can foster innovative thinking. This information can also set the stage for a wide expansion in the variety of crop-related experiments and applications that may contribute to a more sustainable agriculture.

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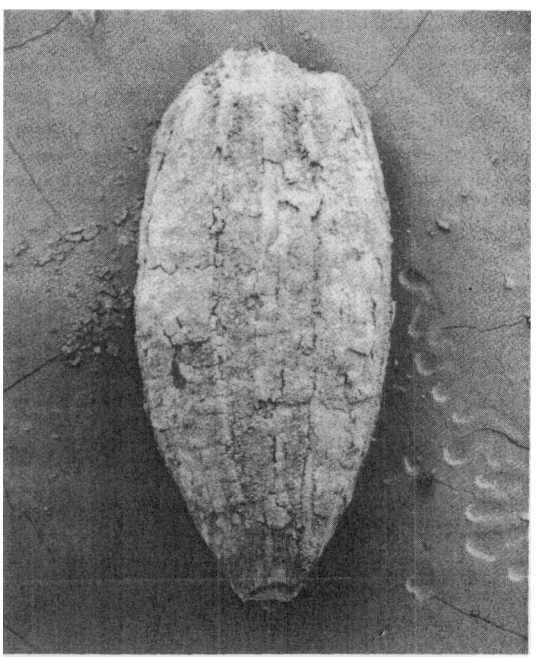

Fig. 1. A 900-year-old seed of little barley (Horedeum pussillumj, ***a native*** *cultivar,* ***from an Indian earthlodge in Mills County, Iowa. Length*** *=* ***2.9 mm.***